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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference A.CASATI 1-1-1	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/01486	International filing date (day/month/year) 18/04/2000	Priority date (day/month/year) 08/06/1999
International Patent Classification (IPC) or national classification and IPC H04L29/06		
Applicant LUCENT TECHNOLOGIES INC		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 25/09/2000	Date of completion of this report 31.08.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Snell, T Telephone No. +49 89 2399 8802 

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International application No. PCT/GB00/01486

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

2-12 as originally filed

1,1a as received on 06/08/2001 with letter of 01/08/2001

Claims, No.:

1-8 as received on 06/08/2001 with letter of 01/08/2001

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

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- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-8
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-8
Industrial applicability (IA)	Yes:	Claims	1-8
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

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EXAMINATION REPORT - SEPARATE SHEET**

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Cited Documents

- D1: EP-A-0 918 417 (LUCENT TECHNOLOGIES INC) 26 May 1999 (1999-05-26)
D2: C PERKINS: 'RFC 2002: IP Mobility Support' IETF RFC - REQUEST FOR
COMMENTS, October 1996 (1996-10), XP002123919
D3: EP-A-0 883 266 (TOKYO SHIBAURA ELECTRIC CO) 9 December 1998 (1998-
12-09)

Re Item V

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step
or industrial applicability; citations and explanations supporting such statement**

1. With respect to claim 1, D1 discloses a method of supporting mobile Internet protocol in a packet radio system upon a mobile system moving from a former routing area to a new routing area and sending to a controlling support node a routing area update message ("agent solicitation message"; see D1, page 16, lines 19-21), in which on receipt of said routing area update message, a mobile Internet protocol agent advertisement is sent only to said mobile system (NB this is assumed to mean **only** to the requesting mobile system, as opposed to a broadcast advertisement which may be captured by any mobile system; see D1, page 16, lines 21-23).
2. The only difference over D1 is therefore the limitation of claim 1 to "the general packet radio system", GPRS being not specifically mentioned in D1. This difference is however trivial, as D1 is based on the same principles as GPRS (the "wireless hub" and the MSC in D1 (see figs 4 and 5) correspond respectively to a SGSN and a GGSN of a GPRS system). Moreover, the interworking function, which supports mobile roaming, may be located in the wireless hub, to avoid establishing a tunnel to the MSC (see page 8, lines 51-53).

The subject-matter of claim 1 therefore does not involve an inventive step over D1 (Articles 33(1) and (3) PCT).

3. Claim 8 is an apparatus claim corresponding to method claim 1. The subject-

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matter of claim 8 therefore also does not involve an inventive step for the same reasons as claim 1 (Articles 33(1)-(3) PCT).

4. Dependent claims 2-7 do not appear at present to contain any feature which in combination with the subject-matter of the independent claim to which the respective dependent claim is appended would result in novel and inventive subject-matter, these additional features being either disclosed or rendered obvious by the documents D1-D3, or being minor details obvious to a person skilled in the art based on common general knowledge of the art (Article 33(3) PCT).

Re Item VII

Certain defects in the international application

1. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

1. Apparatus claim 8 is defined partially in terms of method steps, which leads to unclarity in construing the scope of protection sought (Article 6 PCT).
2. The scope of protection afforded to the term "only" in claim 1 is not clear as this seems to imply that the advertisement is specifically not sent to other systems, but it is not stated which other systems the advertisement is not sent to (Article 6 PCT).

IMPROVED MOBILE INTERNET PROTOCOL DEPLOYMENT IN GPRS NETWORKS

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This invention relates to the use of mobile Internet Protocol in the Universal Mobile Telephone System (UMTS) and the General Packet Radio System (GPRS), and relates in particular to the support of intra-PLMN (Public Land Mobile Network) user mobility by means of Mobile Internet Protocol.

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With the rapidly growing use of Internet Protocol (IP), an effective method of supporting mobility in UMTS and GPRS by use of protocols developed by the Internet Engineering Task Force(IETF) is highly desirable.

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At present, when a Mobile System (MS) moves within the PLMN, its mobility is supported by movement detection algorithms defined in RFC2002 (Request For Comments 2002). These algorithms entail the reception of mobile IP Foreign Agent (FA) advertisements (i.e. messages sent by a mobile to a set of network nodes to indicate that the mobile is attached to that network). To save radio resources, it is not advisable to send such advertisements periodically to each MS. On the other hand, there is no shared channel available to transmit the advertisements to all the MSs.

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It is an object of the invention to provide a method and apparatus by which advertisements can be sent to a MS efficiently, and with minimum handover latency.

In current telecommunications networks, packet mobility is defined for GPRS in TS (Telecommunication Standard) GSM03.60. Internet Protocol mobility support is defined in RFC2002 for IETF.

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According to the invention, in the General Packet Radio Service (GPRS) when a mobile system moves from a former GPRS support node to a new GPRS support node and sends to the new node a routing area update message, a method of supporting mobile Internet Protocol characterized in that on receipt of said routing area update message a Mobile Internet Protocol agent advertisement is sent only to that mobile

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system.

The invention will be described by way of example only with reference to the accompanying drawings in which :-

Figure 1 illustrates schematically the GPRS;

Figure 2 illustrates a deployment scenario which can be implemented by

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application of the invention;

CLAIMS

1 In the general packet radio service when a mobile system moves from a
former routing area to a new routing area and sends to the controlling support node a
routing area update message, a method of supporting mobile Internet protocol
5 characterized in that on receipt of said routing area update message, a mobile Internet
protocol agent advertisement is sent only to said mobile system.

2 A method according to Claim 1 in which said advertisement includes
challenge/response and network access identifier extensions.

3 A method according to Claim 1 or Claim 2 in which said advertisement
10 is sent on a general packet radio service system traffic channel.

4 A method according to any preceding claim in which the mobile Internet
protocol movement detection algorithm present in the general packet radio service is
arranged to detect a change of foreign agent of said mobile system.

5 A method according to Claim 4 in which on detection of a change of
15 foreign agent, said mobile system is immediately registered by mobile internet protocol
registration.

6 A method according to any preceding claim in which the former and
new routing areas are within the same or different GPRS support networks, and the
advertisement is sent after successful sending and receipt of routing area update
20 request, acceptance and completion messages.

7 A method according to any one of claims 1 to 5 in which the former and
new routing areas are within different radio network controllers and the advertisement
is sent after successful sending and receipt of radio network controller relocation
request and completion messages.